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Superfluid hydrodynamic in fractal dimension space

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Abstract

The complex behavior of such quantum fluids like liquid 4He and liquid 3He in nanoporous media is determined by influence of randomly distributed geometrical confinement as well as by significant contribution from the surface atoms. In the present paper Fractional Schrodinger equation has been used for deriving two-fluid hydrodynamical equations for describing the motion of superfluid helium in the fractal dimension space. Nonlinear equations for oscillations of pressure and temperature are obtained and coupling of pressure and temperature oscillations is observed. Moreover coupling should disappear at very low temperatures which provide an experimental test for this theory.

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